REMARKS

Claims 1-13, 15-17, 20-23 and 27-31 are in this application and are presented for consideration. By this amendment, Applicant has amended claims 1 and 23. Withdrawn claims 18, 19 and 24-26 have been canceled subject to Applicant's right to file a divisional application covering the features recited in these claims.

The drawings have been objected to under 37 CFR 1.84(p)(5) because the Office Action states that reference number 32 and reference number 60 are not shown in the drawings.

Applicant respectfully traverses this objection as the drawings have already been amended to include reference numbers 32 and 60 as shown in the replacement sheets of drawings filed with the U.S. Patent and Trademark Office on May 13, 2008. However, Applicant has amended the specification as shown above to make reference to the appropriate figures. Accordingly, Applicant respectfully requests that the Examiner remove the objection to the drawings.

Claim 23 has been objected to because of minor informalities.

Applicant has amended claim 23 paying close attention to the Examiner's remarks. Applicant wishes to thank the Examiner for the careful review of the claims.

Claims 1-5, 8, 12, 13, 15-17 and 20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kyouno (U.S. 2002/0018703) in view of Harada et al. (U.S. 5,112,641).

Claim 1 has been amended to clarify the shape of the storage elements. Each

storage element has an outer ring-shaped stacked area from which a plurality of holding elements (16) extend inwardly with respect to the ring-shaped stacked area. The plurality of holding elements are offset from the ring-shaped stacked area with respect to a stacked direction. As a result of this geometrical shape of each of the storage elements, the substrates can be stored as a batch of substrates having a pitch, which is clearly smaller than the dimension of each storage element in the stacking direction. This advantageously makes it possible to build stacks of nearly any number of storage elements. Extremely small pitches for storing wafers or other substrates can be reached which are only limited by the thickness of the substrates. Although the invention provides for extremely small pitches, the height of the stack is also very small.

A further advantage of the present invention results from the fact that the storage elements rests on each other so that the sum of the ring shaped storage areas of the storage elements leads to a substantially closed housing. Because the holding elements of each storage elements projects inwardly the storage elements as a whole builds a housing for the wafers, which encloses the wafers. This housing advantageously provides a mini clean room environment for the wafers so that the wafers are not contaminated. This clean room is suited for a long-term storage and has nearly the smallest possible volume for the amount of wafers, which are stored by these storage elements. These are significant advantages because in the field of processing wafers it is always tried to hold the volume of the clean room as small as possible in order to reduce the costs. The arrangement of the storage elements also advantages provides a quick and easy access to the wafers since it is not

necessary to remove a housing from the stack. Only the housing, which is defined by the storage elements, at the respective position of the housing has to be opened in order to access the wafer. An additional housing and a removal of such an additional housing for gaining access to the wafers is avoided. During the procedure of access, the protection of the other wafers is maintained by means of the respective upper and lower stacks. The prior art as a whole fails to teach such features or suggest such simple access advantages.

Kyouno discloses a semiconductor manufacturing apparatus with a wafer cassette. A driving motor 4 is driven to move the a stacking stage 5 in a vertical direction along loaner guides 6 so that a selected wafer tray set 2A of wafer tray sets 2 stacked over a stacking stage 5 is adjusted to a predetermined level. The directly over wafer tray set 2B adjacent to the selected or target wafer tray set 2A is locked by a top set 7B of the locking devices 7, wherein the locking pins 7C of the locking devices 7 are inserted into the wafer tray set 2B. The wafer tray sets 2 overlying the wafer tray set 2B are stacked over the tray set 2B. The remaining wafer tray sets 2 underlying the wafer tray set 2B are stacked over the stacking stage 5, wherein the top one of the remaining wafer tray sets 2 underlying the wafer tray set 2B is the target wafer tray 2A. The driving motor 4 is driven to have the stacking stage 5 leveled down in the vertical direction and along the linear guides 6 so that the target wafer tray 2A is adjusted to the predetermined level of the bottom locking device set 7A. Subsequently the target wafer tray 2A is locked by the bottom locking device set 7A, wherein the locking pins 7C of the locking device set 7A are inserted into the target wafer tray set 2A. The remaining wafer trays 2 underlying the target wafer tray set 2A are

stacked over the stacking stage 5 further, the device driving motor 4 is driven to have the stacking stage 5 further leveled down in the vertical direction and along the linear guides 6 so that the remaining wafer trays 2 underlying the target wafer tray 2A are further leveled down together with the stacking stage 5. The top one 2C of the wafer tray sets 2 stacked over the stacking stage 5 is made separated from the target wafer tray set 2A.

Kyouno fails to teach and fails to suggest the combination of a plurality of consecutive storage elements that have an outer stacking area wherein each storage element has a plurality of holding elements that are offset from the outer stacking area with respect to a stacking direction. Kyouno merely discloses storage tray portions 2d of a wafer tray set 2A. However, the storage tray portions 2d of Kyouno are not offset from an outer stacking area as featured in the present invention. Compared with Kyouno, each storage element of the present invention has a plurality of holding elements that are offset from a ring-shaped stacked area with respect to a stacked direction. This advantageously provides the substrates with a pitch that is less than a dimension of each storage element in the stacking direction while significantly reducing the overall height of the stack. This advantageously reduces the overall volume of the stack so that a more compact and space-efficient stack of substrates is provided. Kyouno fails to disclose such space-efficient stacking advantages since the storage tray portions 2d do not extend radially inward with respect to an outer stacking area of the wafer tray set 2A such that the storage tray portions 2d are offset from the outer stacking area. In fact, Kyouno does not provide any teaching or suggestion for a control unit that moves a tool such that the tool engages one wafer in a stack of wafers and

moves the stack to separate one wafer from the entire stack as noted in the rejection. As such, the prior art as a whole takes a completely different approach and does not establish a prima facie case of obviousness as the prior art as a whole fails to teach or suggest important features of the claimed combination.

Harada et al. discloses a wafer transfer method that includes a handling unit 22 that takes desired wafers 1 out of cassette stocking racks through a cassette stocker side 19 and transfers them to a boat 2 so as to arrange them in a predetermined manner or arrangement. The handling unit 22 first moves to a position at which the cassette 7, including the particular wafers 1, is placed, in response to the cooperating functions of the rack transverse traveling motor 25 and an elevating motor 23. Then a slide motor 44 rotates a screw rod 41 in order to position the chuck plates 53, 54, 55, 56, 57 of a wafer chuck 29 between two wafers 1. The elevating motor elevates the wafer chuck 29 a little and separates five wafers 1 from the remaining wafers below, taking or receiving the group of the five wafers 1. The wafers 1 received are sucked by operation of magnetic valves 59, 60, 61, 62, 63 and held by chucking. Then the slide motor 44 is driven to reverse the slider 42 and the wafers 1 are taken completely out of the cassette 7. The rotation motor 30 rotates the slide mechanism 28 through a timing gear 33, the timing belt, the timing gear 35 and a speed reducer 27. The elevating motor 23 elevates the wafer chuck 29 to the inserting position of wafers stored in the boat 2. Then the slide motor 44 advances the wafer chuck 29 to insert the wafers 1 into the boat 2. On operating the magnetic valves 59, 60, 61,62,63 after the wafer insertion, the elevating motor 23 descends the wafer chuck 29 a little to leave the five

wafers in the boat 2 and the slide motor 44 reverses the wafer chuck 29.

Harada et al. fails to provide any teaching or suggestion for the combination of a plurality of consecutive storage elements that have an outer stacking area wherein each storage element has a plurality of holding elements that are offset from the outer stacking area with respect to a stacking direction. Harada et al. merely discloses a pitch changing mechanism as shown in Figure 10. However, the pitch changing mechanism of Harada et al. does not have a plurality of radially inward extending holding elements that are offset from an outer ring-shaped stacking area as claimed. Harada et al. takes a different approach than that of the present invention by arranging a stacking area of the storing elements besides the holding elements on which the wafers rests. This arrangement disclosed in Harada et al. disadvantageously leads to voluminous dimensions of the stack device with respect to its width and also to its height. In contrast to Harada et al., each storage element of the present invention has a plurality of holding elements that are offset from a ring-shaped stacked area with respect to a stacked direction. This advantageously reduces the overall height and volume of the stack so that a more compact and space-efficient stack of substrates is provided. Compared with the present invention, the pitch changing mechanism of Harada et al. does not have a plurality of holding elements that are offset from an outer ring-shaped stacking area as claimed, which provides for a stack of substrates having an extremely large height and volume. As such, the prior art as a whole takes a completely different approach and fails to establish a prima facie case of obviousness.

The Office Action relies on the teachings of Harada et al. to disclose a control unit

that is programmed to move a tool as recited in claim 1. Applicant respectfully disagrees with this interpretation of Harada et al. Although it may be true that Harada et al. discloses a control unit, the control unit fails to be programmed to move a tool such that the tool engages one wafer in a stack of wafers and moves the stack to separate one wafer from the entire stack as claimed. At most, Harada et al. discloses an elevating motor that elevates a wafer chuck 29 to separate five wafers 1 from the remaining wafers below, wherein the five wafers 1 are transferred to a boat 2. However, Harada et al. is completely void of any teaching or suggestion for moving a tool such that the tool separates a storage element from an upper stack of storage elements and a lower stack of storage elements as recited in claim 1. As such, the prior art as a whole takes a completely different approach and does not establish a prima facie case of obviousness since the prior art as a whole does not direct a person of ordinary skill in the art toward essential features of the claimed combination. Accordingly, Applicant respectfully requests that the Examiner favorably consider claim 1 as now presented and all claims that depend thereon.

Claims 6 and 7 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kyouno in view of Harada et al. and further in view of Kato et al. (U.S. 5,752,609). Claims 9-11 and 22 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kyouno in view of Harada et al. and further in view of Tanaka et al. (U.S. 2002/0002946). Claim 21 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Kyouno in view of Harada et al. And further in view of Davis et al. (U.S. 4,966,519). Claim 23 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Kyouno in view of Harada

et al. and Tanaka et al. and further in view of Davis et al.

All of these rejections are based on the interpretation of Kyouno and Harada et al. as teaching the structure of the plurality of storage elements. A fair reading of the Kyouno and Harada et al. references indicates that the Kyouno and Harada et al. references only disclose arranging a stacking area of storage elements besides holding elements on which wafers rest. The references as a whole clearly do not direct a person of ordinary skill in the art towards the invention as claimed. Accordingly, reconsideration of these rejections is requested.

Applicant has added new claims 27-31. New independent claims 28 and 30 provide for similar features as found in amended claim 1, but in different claim language. Dependent claims 27, 29 and 31 have been added to further clarify the features of the invention. Applicant respectfully requests that the Examiner favorably consider new claims 27-31 as presented.

Favorable consideration on the merits is requested.

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Attached: Petition for Three Month Extension of Time

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SHOULD ANY OTHER FEE BE REQUIRED, THE PATENT AND TRADEMARK OFFICE IS HEREBY REQUESTED TO CHARGE SUCH FEE TO OUR DEPOSIT ACCOUNT 13-0410.